User Manual

DRAFT COPY OF THE INSTRUCTION MANUAL

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BC780XLT
Product Definition
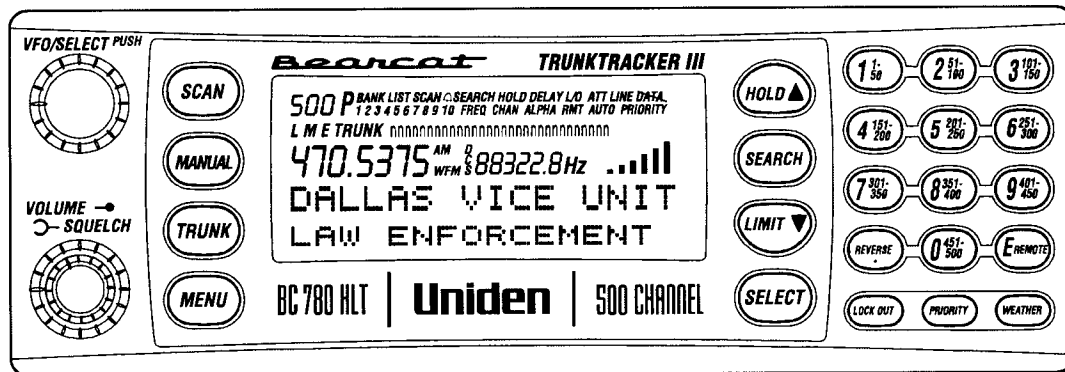
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NOTICE:

Modifying or tampering with internal components of your product can cause
a malfunction and might invalidate its warranty and void your FCC
authorization to operate it.   If your product is not performing as it should,
take, it to your local store for assistance.

1. Executive Summary

The BC780XLT will be marketed at the public safety professional as well as the
high-end scanner enthusiast for monitoring of both Motorola, Ericsson and LTR
trunking systems.

The unit will be designed to compete with an upcoming model from Radio Shack
in addition to the Relm MS200 and the future GRE high end models.

2. Background

The BC780XLT will replace the BC9000XLT and the now obsolete BC760XLT.
The BC780XLT will offer two line alpha capabilities, Trunktracker III,
CTCSS/DCS, 500 Programmable Channels, PC Control Capabilities, Smart
Scanner download Capabilities, and full back lit illumination of LCD and keys.

3. Product Specifications

Channels	500
Bands	Continuous Band (see section 7.1.7)
Banks	10 Banks of 50
Frequency Coverage	Continuous Band Scanner from 25MHz to 1300MHz excluding the cellular bands and UHF TV band. See section on steps.
Adjustable Step Sizes	2.5KHz, 5KHz, 7.5KHz, 10KHz, 12.5KHz, 20KHz, 25KHz, 50KHz, 100KHz
LCD Display	2 line Alphanumeric with icons and back lit
Characters per Line	16 alpha per line X 2 lines =32 total
Modes	AM, FM, WFM
Trunktracking	Motorola, GE, LTR, All Band
CTCSS/DCS	yes

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Computer Interface	SmartScan, PC Control, Clone Modes
Keys/Controls	
Power On/Off, Volume Control	yes
Squelch	yes, outer ring around Power On/Off
VFO Knob	yes, used for scrolling through options in the software menu, programming alpha characters. Press in to confirm what is highlighted on the alpha menu
Scan	yes
Manual	yes
Trunk	yes, to program a bank as trunked
Hold/ △	yes
Limit/ △	yes
Search	yes
Menu	yes, used to access software menu to operate many functions of the BC780XLT
Select	yes, used to confirm highlighted choices, also mutes radio in scan mode
Weather	yes, will also access FIPS codes programming
Priority	yes
Lockout	yes, press and hold to clear lockouts

4. Packaging Specifications

AC Adapter	1
Telescopic Antenna	1
Flexible Mobile Antenna	1
Direct Wire Power Cord	1
Cigarette Lighter Adapter	1
Mobile Bracket and Hardware	1
Programming Cable (DB-9 serial)	1
Printed Materials	
Owners Manual	English
Quick Reference Material	No
POP sticker	No
Registration Card	yes
Starter Frequency Guide	yes
Trunking Frequency Guide	yes
Bearcat Application Form	yes
Frequency Form	yes

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NiCd Warning	no
FCC Warning	yes
PC Control Software Flyer	yes
Packaging	
Package	DBox Film supplied by UAC
DBOX	4 color
Inner Carton	Cardboard
Other	
ID Label	yes (UJ)
Patent Label	yes (UJ)
Regulation	FCC
Safety Standard	UL
Product UPC Code	0 50633 65014 1

5. Key Functionality

5.1 ON/OFF/Volume Knob

The on/off/volume knob will turn in a clockwise direction to turn the power on. Continuing to turn the knob clockwise will increase the volume of the radio. A click feel should be felt upon turning the knob between the on and off position.

5.2 Squelch Ring

The squelch ring will control the threshold level of squelch. This ring will be turned in a clockwise direction to open the threshold level for reception of a weaker signal.

5.3 VFO/Select Knob

This knob will be used to scroll through many sections of the menu in addition to programming alpha characters. This knob will also be used to scroll through frequencies and step through channels. To actually select what is displayed on the screen this knob may be pressed in to select.

As on the Sportcat SC-200, the VFO can also be used to tune from a user entered (but not programed) frequency. From Manual mode, the user inputs a frequency (example 155.4150 but does not press the E key). Then the user turns the VFO to the right or left (up or down in frequency) and the scanner (which is automatically placed in VFO frequency tune mode) will receive transmissions as it tunes. The user can stop on any frequency and enter it into memory.

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Note: The VFO will also be used to tune through all user optional features, including all the CTCSS and DCS codes, the delay timing options, review of the frequency and talkgroup lockout lists, step and mode options, pre-programmed fleet map list, service search list, etc. See additional information in the sections below.

5.4 Hold△ Key

This key will function in two different capacities. When the scanner stops during a search to listen to a transmission, depressing this key will hold on the frequency. Depressing the key again will step the frequency up by the smallest step possible in the given bandwidth. When pressing this key in the Manual mode the icon for *HOLD* will appear in the display. If this key is pressed and held during a search, the direction of the search, if descending, will change to ascending.

The second function that this key will serve is in the Menu mode where this key will be used to move in an upward direction to highlight choices.

5.5 Search Key

This key will be used in conjunction with the LIMIT and HOLD keys to search. In the Manual mode the user will use the keypad to input a lower and upper frequency and press the LIMIT key after each of the limits. Then by pressing the SEARCH key the scanner will then search the range between the limits. The LCD display should show the icon for SEARCH while searching and when stopped on a frequency by the hold key or if it receives an incoming transmission. If the scanner stops on a transmission the user can depress the HOLD key as described in section 5.4.

5.6 Limit/△ Key

This key will function in two different capacities. This key will be used in the Manual mode to set a lower and upper frequency range in order to do a search. From the Manual mode, a user will use the keypad to enter a frequency and then press the LIMIT key. The user will then enter a higher frequency and press the LIMIT key once again setting up a search range. Pressing the SEARCH key will then allow the scanner to search the range. If this key is pressed and held during a search, the direction of the search, if ascending, it will change to descending.

The second function will allow the user to scroll down in the software menu section.

5.7 Select/Mute Key

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The SELECT key will be used in the Menu mode in order to select the highlighted choice which will appear on the LCD screen. In scan, manual or search mode if this key is pressed, it will mute the audio until the user presses this key again or turns the scanner off and then on. The LCD display will show MUTE on the second line of text.

5.8 Lockout Key

This key will be used to lockout either a channel in the Scan mode or an ID in the Trunking mode. Simply press this key when the scanner has stopped on a transmission to lockout the channel or ID. The L/O icon should appear in the LCD screen when the key is depressed.

Press and hold for 1.5 seconds in Manual mode bring up a list of locked out ID's. Press again to unlock each channel. If the ENTER key is pressed it will unlock all of the channels.

Press and hold for 1.5 seconds in Trunking to bring up a list of locked out ID's. Press again to unlock each ID. If the ENTER key is pressed it will unlock all of the ID's.

5.9 Priority Key

This key will be used to set a channel (a frequency or a talkgroup ID for trunked systems) as a priority. The PRIORITY key in the Manual mode can be pressed to turn the priority function on or off. In the Manual mode the priority key can be pressed and held for 1.5 seconds to re-assign the priority channel for the existing bank. In the Scan mode the PRIORITY icon should show in the LCD screen whenever the unit is doing a Priority scan.

In the Scan Mode press priority to activate or deactivate the priority feature. The LCD display should show the *P* icon when the priority channel for the specific bank is active. Also in the Scan Mode if the PRIORITY key is pressed and held for 1.5 seconds it will activate PRIORITY PLUS. The feature will allow the scanner to scan all frequencies and talk group ID's (for trunk system) that have been designated as priority channels, however, there will be no overriding priority in this case. During this operation the Priority icon will flash.

5.10 Weather Key

The WEATHER key can be pressed at anytime to allow the user to instantly listen to the active NOAA weather frequency in their area. Press this key again to activate the weather alert function. The bell icon will be displayed as soon as this feature is activated. Press and hold the weather key from the weather alert mode and the LCD display will show the first FIPS code programming slot. The FIPS codes can be entered via the keypad. After the six digits have been entered, the user can depress the HOLD or LIMIT keys to go to the next FIPS

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code location.   The total number of locations is 15.   The LCD display should use channel number display for the location number and the frequency display as the actual FIPS code being programmed. (FIPS can also be set by SmartScanner.)

5.11   Trunk Key

The TRUNK key will allow the user to enter the trunk programming mode.   The user does not have to press and hold.   Once the user presses the TRUNK key, the LCD will display the different types of trunking systems on the two text lines as follows:

> MOT Type 2 800
> MOT Type 1 800
> MOT Type 2 900
> MOT Type 2 UHF
> MOT Type 2 VHF
> GE/E 9600
> GE/E 4800
> LTR
> OFF

The user will be able to use the UP/DOWN arrow keys, VFO knob to select the type of trunking system that they wish to enter.   Once the type is selected by the SELECT key, the LCD will flash the bank number, TRUNK, BANK*.   This will automatically take the user to the first channel in the bank that he was in from the Manual mode.

EX: the user is on channel 126 in the Manual mode and presses the TRUNK key.   The LCD display will flash the bank number, TRUNK, BANK and display the channel number 121.

*NOTE: In certain cases, depending on the type of system chosen, there may be sub-menus that will appear after selecting the trunk type in order to format the trunk correctly.   The two text lines will be used to show the sub-menu choices and the UP/DOWN keys/VFO knob will be used to highlight.   SELECT will be used to select the choices.   They affect types are listed below with their sub-menu options:

MOT Type 1

Fleet Map 1	Fleet Map 2	Fleet Map 3	Fleet Map 4
Fleet Map 5	Fleet Map 6	Fleet Map 7	Fleet Map 8
Fleet Map 9	Fleet Map 10	Fleet Map 11	Fleet Map 12
Fleet Map 13	Fleet Map 14	Fleet Map 15	Fleet Map 16
Custom Map			

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Block 1	Block 2	Block 3	Block 4	Block 5
Block 6	Block 7			

Size 1	Size 2	Size 3	Size 4	Size 5
Size 6	Size 7	Size 8	Size 9	Size 10
Size 11	Size 12	Size 13	Size 14	

MOT Type 2 UHF

Base 1	Base 2	Base 3
Offset 1	Offset 2	Offset 3
Spacing 1	Spacing 2	Spacing 3

MOT Type 2 VHF

Base 1	Base 2	Base 3
Offset 1	Offset 2	Offset 3
Spacing 1	Spacing 2	Spacing 3

This will occur since EDACS needs to be programmed from the first channel of a bank. The user can start programming frequencies into the trunk. The ENTER key will be used to enter each frequency. Once all of the frequencies for the trunk have been programmed, the user can press SEARCH. This will search the trunk the same as our previous scanners, however the LCD readout should show the frequency in the frequency area and use the digits to the right to display the ID's. On the text lines, the ID tag should be displayed on the top line and the bank tag should be displayed on the bottom line.

OTHER NOTES: Once a trunked system has been programmed into the scanner, the user does not have to press the TRUNK key to begin trunking scan and search functions. Pressing the SCAN key will activate trunk scan for trunked systems and conventional scan for all other frequencies. If the user wishes to conventionally scan frequencies programmed as trunked, he must go into MENU 3-2-9 and turn trunking off.

Pressing MANUAL or the UP/DOWN arrow keys will allow the user to move through the ID locations. From any ID, the VFO knob may be pressed to program an alpha tag. (See alpha tag information for functionality 6.1.9)

5.12 E/Remote Key

This key will be used to Enter (program) frequency and other information into the scanner. When pressed and held (1.5 seconds, double-beep), it will put the scanner into REMOTE mode (the remote icon will light). The user can now use his PC to program or control the scanner. The MANUAL, SCAN, SEARCH and LOCKOUT keys, as well as the 12-keys for turning banks off and on, and the volume, squelch and VFO, should all be useable while in REMOTE mode (the user can either use his PC or these controls to operate the scanner).

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The user can also press and hold this key and then turn the scanner on. The alpha display will show three options:

1. SMARTSCANNER
2. PC CONTROL
3. CLONE

See 6.15 through 6.17 for details on the user options within these three selections.

5.13   Reverse/. Key

This key will allow the user to listen to the reverse frequency of the repeater output or input.   This function can be used in Manual, Scan, Service Search or Search Modes (both Conventional or Trunked).   This function will continue to check the reverse frequency for as long as the user holds down the key.   If the user presses this key on a frequency that does not have an offset, the second (bottom) line of the alpha text display will show "NO REVERSE.

The following is the REVERSE list of offsets.

HAM RADIO BAND
Please see the attached Excel file for all Ham radio repeater pairs and positive and negative input/output offsets:

420-430 MHz

Range	Offset
420.000-424.9875	+5 MHz
425.000-429.9875	-5 MHz

450-470 MHz

Range	Offset
450.000-454.9875	+5 MHz
455.000-459.9875	-5 MHz
460.000-464.9875	+5 MHz
465.000-469.9875	-5 MHz

470-512 MHz

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Range	Offset
470.000-472.9875	+3 MHz
473.000-475.9875	-3 MHz
476.000-478.9875	+3 MHz
479.000-481.9875	-3MHz
482.000-484.9875	+3 MHz
485.000-487.9875	-3 MHz
488.000-490.9875	+3 MHz
491.000-493.9875	-3 MHz
494.000-496.9875	+3 MHz
497.000-499.9875	-3 MHz
500.000-502.9875	+3 MHz
503.000-505.9875	-3 MHz
506.000-508.9875	+3 MHz
509.000-511.9875	-3 MHz

806-956 MHz

Range	Offset
806.000-823.9875	+45 MHz
851.000-868.9875	-45 MHz

896-956 MHz

Range	Offset
896.000-901.000	+39 MHz
935.000-940.000	-39 MHz

6. Software Menu System

The MENU key, when pressed will access a four section menu of user selectable options and features. All of the features will be numbered so the user can access the menu system by either the keypad, up/down arrow keys with SELECT key, or VFO knob and SELECT key.

6.1 System Portion

Most of the features in this section are user preferences. The functions in this section are DIMMER, SCREEN MASK, KEY BEEP, ENTERLOCK, PC CONTROL, CLONE, SMART SCAN, DATA SKIP, and BANK TAG. By pressing MENU from manual mode or when the scanner has stopped on a frequency, the user will see the first two options of the menu displayed in the text portion of the screen as shown below.

1 SYSTEM

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*Note: In the illustration above the line showing 1 **SYSTEM** is the line actually highlighted since the LCD is typically back lit.*

For the user to select **1 SYSTEM** he may press the SELECT key or press the number 1 on the keypad. For the user to access more options in the menu he may use the UP/DOWN arrow keys, VFO knob (clockwise/up or counterclockwise/down), or if the user becomes familiar with the layout of the menu he can use the keypad to select an option that is not appearing on the screen.

Note: These three options for scrolling through the menu will apply for all sections of the menu system. Referred to from here on as select processes.

Note: All other functions that are applicable at the time, channel, frequency, etc will still be displayed.

6.1.1 Dimmer Function

The dimmer function allows the user to select the brightness level of the LCD screen. The default setting for this is HIGH. After selecting the SYSTEM menu the user will see the following choices displayed on the two lines of text in the LCD.

```
1 HIGH
```

For the user to turn the back lit LCD off, he would follow the illustrated sequence below.

```
1 HIGH
```

Press the Down arrow key or rotate VFO knob one click to reach the following display.

```
.
```

Press the Down arrow key, or rotate VFO knob one more time to reach the following display which shows the OFF function selected.

```
.
```

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In order to choose the OFF function the user may press any of the selection processes. Upon doing this the scanner will resort back to the manual mode that it started in. The MEDIUM selection should be 50% of the HIGH brightness level.

6.1.2 Screen Mask

The screen mask mode will allow the user to eliminate 2 lines from the LCD display. The L M E Trunk line and the line that shows frequency, mode, CTCSS/DCS, tone codes, and signal meter will both go dark when SCREEN MASK is in the ON position. The default for this feature will be OFF.
From Manual mode press the MENU key. The following display appears:

```
1 SYSTEM
```

The system option is highlighted. Press any of the three selection processes described in 6.1.1 and the display will show:

```
1 DIMMER
```

Press any of the selection processes to highlight the SCREEN MASK function as shown below.

```
.
```

Press any of the selection processes to select the SCREEN MASK function and the following display will appear:

```
1 ON
```

Press any of the selections processes to selected the highlighted ON feature. Once selected the radio will return to its previous display in the manual mode but not displaying the two lines noted above.

6.1.3 Key Beep

Key beep is a feature that will give a confirming Beep tone for any key that is depressed. The default for this feature is in the ON position. For selecting this feature to be deactivated please follow the same operation steps as SCREEN MASK (Section 6.1.2)

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6.1.4 Enterlock

The ENTERLOCK feature will stop some one from entering any frequencies in to channels while this mode is selected in the ON position. The default for this feature is OFF. Please see the operational steps as outlined in 6.1.2.

6.1.5 PC Control

The PC CONTROL feature will allow the user the choice of which baud rate the modem will connect with. The choices will be 2400, 4800, 9600, 19200. The 9600 baud rate will be the default. Please see the operational steps as outlined in 6.1.2.

Under PC Control, the user will be able to download (PC to scanner) and upload (scanner to PC) information and place the scanner under computer control (see BC-245 and BC-895). New commands will allow for remote programming and control of CTCSS/DCS, Alpha Tags (channel and talkgroup), variable delay settings, Attenuate by channel, LTR Trunking, Motorola Control Channel only trunking, I-Call and other new trunking features, FIPS Codes, Beep Alert settings, Dimmer settings, Keypad Beep, Tone Search, Tone Lock (exclude), Chain Search, Enter Lock, Priority Plus, steps, modes, etc.

6.1.6 Clone

The CLONE feature will allow for cloning of another scanner. The two scanners must be connected by a cloning cable for this to take place. Please follow the same operating specs outlined in 6.1.2 in order to choose if this unit will be the MASTER or SLAVE. The MASTER setting will be the default mode. Once the radios are connected and a MASTER and SLAVE have been selected, the 1st line of text in the display will display either MASTER or SLAVE. Pressing the E/REMOTE key will start the data transfer. When the transfer is complete the 1st line of text in the display will display the word DONE for confirmation. Pressing any key will place the scanner in scan mode of its newly programmed information.

6.1.7 Smart Scan

The SMART SCAN feature allows the user to access a server that contains a database of frequencies. In the SMART SCAN section of the menu, the user can select options such as TRANSFER SPEED, FLOW CONTROL, and DIAL TYPE. The actual dial up procedure is the same as the SC200. To access the options please refer to the same operating procedures as outlined in Section 6.1.2. No icons will appear for this feature. The default settings should be as follows:

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        Transfer Speed   9600 BAUD
        Flow Control   OFF
        Dial Type   TONE

The SMART SCAN feature should also now the remote downloading of CTCSS/DCS tones and FIPS codes for SAME Weather Alert.

6.1.8 Data Skip

The DATA SKIP feature will activate a filtering system that allows the scanner to recognize data transmissions and skip over listening to them.   This feature is turned on or off system wide.   The default for this feature is off.   When it is turned on the icon for "DATA" will illuminate.

6.1.9 Bank Tag

The Bank Tag feature will allow the user to assign an alpha label to each of the 10 banks.   The user will select one of the ten banks from the menu.   Selecting the bank in the menu can be done by pressing select or pushing in the VFO knob.   Once selected the bank number icon will flash and the LCD screen will start on the bottom text line with a flashing square.   The user may use the VFO knob or the UP and DOWN arrow keys to search through the following alpha/character list:

A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,a,b,c,d,e,f,g,h,i,j,k,l,m,n
,
o,p,q,r,s,t,u,v,w,x,y,z,1,2,3,4,5,6,7,8,9,0,!,@,#,$,%,&,*,(,),-,/,<,>,.,space

Once the character of the users choice appears on the screen the user can press in on the VFO knob to select the character and the cursor moves to the next position to the right. Upon entry of the last character on the bottom row, the scanner will have programmed the bank with the alpha tag and will go back to the mode that it was in before it entered the menu system.   The ALPHA icon will be illuminated whenever the specific bank is active in any mode.

Note: If the user does not use all of the space provided, pressing and holding the SELECT key for 1.5 seconds will be used to program the alpha tag and return to the screen prior to entering the menu system.

7.   Channel Portion

The channel portion of the menu system is designed to assign certain features to a specific channel.   The Channel portion of the menu contains the following nine features: ALPHA TAG, DELAY, CTCSS, DCS, BEEP ALERT, ATTENUATE, STEPS, MODE, RECORD.

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7.1   Alpha Tag

The ALPHA TAG feature will allow the user to assign each channel an alpha description.   The same characters as outlined in Section 6.1.9 will be used in alpha tagging each channel.   From Manual mode the user will press the MENU key, select the CHANNEL portion of the menu, select the ALPHA TAG and the cursor will appear as described in Section 6.1.9 (except it will appear on the top text line).   Selection of the alpha characters will all follow the same steps as outlined in Section 6.1.9.   The ALPHA icon will appear in the display any time a channel is alpha tagged. Note that the user can also program Alpha Tags in Manual Mode by pressing the VFO key and selecting ALPHA and then using the UP/DOWN arrow keys or the VFO tuner to make the characther selections.

7.2 Delay

The DELAY feature will allow a user to select from different timing delays on a channel that is being scanned.   From the Manual mode the user will select the CHANNEL portion of the menu, then select the DELAY section, and then will have the option to select from the following eight options: 0 SECONDS, 1 SECONDS, 2 SECONDS, 4 SECONDS, INFINITE, -2 SECONDS, -5 SECONDS, -10 SECONDS.   The delay settings will operate in the following way:

0 SECONDS: No Delay
1 SECOND: The scanner will wait on a frequency or channel for 1 seconds after a transmission has stopped.
2 SECONDS: The scanner will wait on a frequency or channel for 2 seconds after a transmission has stopped.
4 SECONDS: The scanner will wait on a frequency or channel for 4 seconds after a transmission has stopped.
INFINITE: The scanner will wait on a frequency or channel until the user presses any key to make the scanner start scanning again.
-2 SECONDS: The scanner will wait on a frequency or channel for only 2 seconds and then continue scanning. *(see note below)*
-5 SECONDS: The scanner will wait on a frequency or channel for only 5 seconds and then continue scanning. *(see note below)*
-10 SECONDS: The scanner will wait on a frequency or channel for only 10 seconds and then continue scanning. *(see note below)*

The default for this feature is 2 SECONDS delay.   The DELAY icon will appear anytime a channel is scanned that has this feature assigned to it.   The icon will disappear once the scanner continues scanning again.   The negative number delays act as a pause on a channel for the specified time.

NOTE: The negative delays (also called PAUSE) will stay on a channel for the specified times and then continue to scan when the delay times out.   EX 1:   If the Delay has been set for –5 seconds and a transmission lasts for 8 seconds,

the scanner will resume scanning after 5 seconds and the last 3 seconds of the transmission will not be heard. EX 2:_If a channel has been set with a 10 second pause and the channel becomes active for a transmission of 6 seconds, there should be a 2 second default before the scanner resumes scanning (if there is has been no further transmissions within the two seconds). If their is a transmission during the two second delay period, then the timer should reset and pause should be in effect for another ten seconds.

Important Programming Note: The default delay is two (2) seconds. Whenever the user programs a channel the scanner will set a default delay of two seconds (as we do not have a DELAY key this is important.) If the user wishes to change the default he can go into the Menu.

7.3 CTCSS

This feature allows the user to assign a CTCSS code to a specific frequency. Upon the user selecting CTCSS the smaller digits next to the frequency display will light up and display the first CTCSS frequency. The user may use the VFO knob or the UP and DOWN arrow keys to move the display to the desired tone code frequency setting. To assign it to a frequency the user may press either the VFO knob or the SELECT key. Once assigned the scanner will return to the mode of operation it was in prior to adding the CTCSS code. When a CTCSS is assigned to a frequency, the C & S letters to the left of the tone code should appear in the LCD. The following CTCSS frequencies are included:

67.0	71.9	74.4	77.0	79.7	82.5	85.4	88.5	91.5
94.8	97.4	100.0	103.5	107.2	110.9	114.8	118.8	123.0
127.3	131.8	136.5	141.3	146.2	151.4	156.7	162.2	167.9
173.8	179.9	186.2	192.8	203.5	210.7	218.1	225.7	233.6
241.8	250.3							

7.4 DCS

The DCS feature will allow the user to assign digital coded squelch tones to a desired frequency. When a DCS is assigned to a frequency, the D, C & S letters to the left of the tone code should appear in the LCD. This operation of this feature will be exactly the same as CTCSS (Section 7.1.3) except for the different tone codes below:

023	025	026	031	032	036	043	047	051	053
054	065	071	072	073	074	114	115	116	122
125	131	132	134	143	145	152	155	156	162
165	172	174	205	212	223	225	226	243	244
245	246	251	252	255	261	263	265	266	271
274	306	311	315	325	331	332	343	346	351

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356	364	365	371	411	412	413	423	431	432
445	446	452	454	455	462	464	465	466	503
506	516	523	526	532	546	565	606	612	624
627	631	632	654	662	664	703	712	723	731

7.5 Beep Alert

The BEEP ALERT function will allow the user to program any channel with an alert that will let the user know that a transmission has come in on a designated channel.   This function can be programmed for up to all 500 channels if desired. Once the user selects the BEEP ALERT option from the menu, the two choices that will display are ON or OFF (OFF is default).   When ON is selected and assigned to a channel, the bell icon will be displayed.   When BEEP ALERT is programmed for a channel, a fast "beep-beep" will be heard when the scanner stops on a transmission for that channel.

7.6 Attenuate

The ATTENUATE feature will allow the user to attenuate the sensitivity by channel.   The user will have the options of ON or OFF.   The default setting is OFF.   The level of attenuation should, should be the same as what is used on other current scanners.

7.7 Steps

The STEP feature will allow the user to be able to change the default step size for each of its channels and frequencies.   The following chart will show the default step sizes for each of the frequency ranges:

25.000-25.9950	5.0 KHz
26.000-28.9950	5.0 KHz
29.000-53.9950	10.0 KHz
54.000-71.9950	5.0 KHz
72.000-75.995	5.0 KHz
76.000-87.9950	50 KHz
88.0000-107.9950	100 KHz
108.0000-136.9950	25 KHz
137.0000-162.0000	5.0 KHz
162.0125-173.9875	12.5 KHz
225.000-399.9950	50 KHz
400.000-511.9950	12.5 KHz
806.000-823.9875	12.5 KHz
849.0125-868.9875	12.5 KHz
894.0125-1300.000	12.5 KHz

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The user will go through the Menu and select the STEP option. The next screen will display the following step sizes (on the 2 text lines) that the user can select to assign to a channel:

1   5 KHz
2   7.5 KHz
3   10 KHz
4   12.5 KHz
5   20 KHz
6   25 KHz
7   50 KHz
8   100 KHz

The user will scroll through the options using the UP/DOWN arrow keys, VFO knob, or by directly accessing the corresponding numerical choice on the keypad. Once the choice has been selected, the scanner will go back to the manual mode it was in before the Menu system was entered. If stopped on this channel, the user can rotate the VFO knob to make steps from the existing channel in whatever step mode has been assigned.

NOTE: There will be no display in the Manual mode showing the steps that are assigned to a channel. The user will need to go back into the menu to see which step is assigned to the channel.

7.8 Mode

This feature will allow the user to change the mode that is assigned to a channel. The three options that the user can select will be AM, FM, and WFM. The default modes for each frequency band are as follows:

25.000-25.9950	AM
26.000-28.9950	AM
29.000-53.9950	FM
54.000-71.9950	WFM
72.000-75.9950	FM
76.000-107.9950	WFM
108.000-136.9950	AM
137.000-173.9950	FM
174.000-215.9950	WFM
216.000-224.9950	FM
225.000-399.9950	AM
400.000-511.9950	FM
806.000-823.9875	FM
849.0125-868.9875	FM
894.0125-1300.000	FM

The LCD icon for the appropriate selection will appear in the LCD for the default mode and will only change if the user go into the menu and makes a change to the default settings.

7.9 Record

This function will allow the user to designate a channel to be recorded by an external device.   The user will be able to select between ON or OFF.   The default setting is OFF.   The LINE icon will appear in the LCD when a channel has been assigned the record feature.

8. Trunk Portion

Once a user chooses a bank to be a trunked bank he will have the following options in the TRUNK menu: TRUNK TYPE, I-CALL, EMERGENCY ALERT, STATUS BIT, SQUELCH DETECT, CONTROL CHANNEL and set ALPHA TAGS, DELAY, BEEP ALERT AND RECORD. Talkgroup priority can be set from the front panel key (one priority per Scan List bank) and talkgroups can be locked-out, reviewed and cleared from the front panel Lockout key.

8.1 Bank Select

The BANK SELECT feature will have the user choose one of the ten banks to assign a trunked system.   The user will press the trunk key once (press and hold is no longer necessary) and the icons L M E TRUNK, BANK, and the 1, 2, -10 icons will all flash until the user make a selection with the 12-keys (1-10), or with the menu which will display 1, 2 (and 3-10) and selects a bank to program.

8.2 Trunk Type

Upon selecting the bank, the menu will display TRUNK TYPE and I-CALL. If the user selects 1, Trunk Type, the user will have the following choices to choose from:

1. Type II 800
2. Type I
3. Type II 900
4. Type II UHF
5. Type II VHF
6. GE/E 9600
7. GE/E 4800
8. LTR
9. OFF

The first option will display on the two text lines and the user can scroll from there using previously described methods.

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8.2.1   Type II 800

When highlighted the user may select this type of trunk system. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8..2.2   Type I 800

This trunk type requires multiple options to be selected.   After selecting this trunk type the user will need to select the map type for the system.   The user will be able to scroll through the following options:

Fleet Map 1	Fleet Map 2	Fleet Map 3	Fleet Map 4
Fleet Map 5	Fleet Map 6	Fleet Map 7	Fleet Map 8
Fleet Map 9	Fleet Map 10	Fleet Map 11	Fleet Map 12
Fleet Map 13	Fleet Map 14	Fleet Map 15	Fleet Map 16
Custom Map			

After selecting a fleet Map, the user may be required to select a block.   The following are the options:

Block 0	Block 1	Block 2	Block 3
Block 4	Block 5	Block 6	Block 7

After selecting a Block, the user may be required to select a Size.   The following are the options:

Size 1	Size 2	Size 3	Size 4
Size 5	Size 6	Size 7	Size 8
Size 9	Size 10	Size 11	Size 12
Size 13	Size 14		

In all of these cases, the user will the VFO, UP/DOWN to highlight the option that they want, then press the SELECT key to select their choice. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.3   Type II 900

When highlighted the user may select this type of trunk system. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

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8.2.4   Type II UHF

This trunk type will require the user to make additional selections.   The options that the user can select from are the following:
Base 1
Offset 1
Spacing 1
Base 2
Offset 2
Spacing 2
Base 3
Offset 3
Spacing 3

The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.5   Type II VHF

This trunk type will require the user to make additional selections.   The options that the user can select from are the following:

Base 1
Offset 1
Spacing 1
Base 2
Offset 2
Spacing 2
Base 3
Offset 3
Spacing 3

The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.6   GE/E (EDACS) 9600

When highlighted the user may select this type of EDACS trunk system. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.7   GE/E (EDACS) 4800

When highlighted the user may select this type of EDACS trunk system. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.8   LTR

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When highlighted the user may select this type of trunk system. The user will then have the option to program the frequencies for the system or continue with trunking menu options.

8.2.9 OFF

The user may select this option to scan the bank, that had originally been programmed as trunked, conventionally.

8.3 I-Call

The I-Call function will allow the user to receive I-call communications in trunked systems as specified in the deliverables by Greg Knox/Synthecomm (for Motorola) and by Terrence Brennan/G-Tracker (for Ericsson). The user will make the selection of ON or OFF for this feature. The default setting will be ON. If an I-Call transmission is made the first line of the alpha display should read "I-CALL."

8.4 Emergency Alert

The EMERGENCY ALERT function will allow the user to flag the proper control channel bit (either Motorola or Ericsson) so that when a user within the trunked radio system transmits an emergency signal the scanner will beep three times at the start of the transmission and the word EMERGENCY will flash in the bottom row of the alpha display alternately with any bank tag. The user will make the selection of ON or OFF for this feature. The default setting for this feature is ON.

8.5 Status Bit

The STATUS BIT function will allow the user to receive all patch and other non-standard messages by default for Motorola systems (see the BC-245). For EDACS systems, by changing the setting to OFF, digital transmissions will be received by the scanner (see the digital bit information provided by Brennan.) The user will make the selection of ON or OFF for this feature. The default setting is ON.

8.6 Squelch Detect (Motorola Only)

This feature will allow the user to utilize squelch, rather than an EOT signal, to return the scanner to the control channel from a working/voice channel (see the BC-245 and later production versions of the BC-235 and BC-895). The user will make the selection of ON or OFF for this feature. The default setting for this feature will be OFF.

8.7 Control Channel (Motorola 800/900 MHz Only)

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This feature will allow the user to automatically "trunk" a system by only programming the control channel (see the Greg Knox/Synthecomm Deliverables). The user will make the selection of ON or OFF for this feature. The default setting for this feature will be OFF. The user will have programmed only a control channel into the selected bank. Once this Control Channel only mode selection is made, the scanner will look for the control channel within the bank and begin trunk (search) functionality. If no Motorola 800 or 900 MHz control channel is found, the scanner will report an ERROR message and a bee-boop sound.

8.8   Talkgroup Settings

Allows the user to program IDs for a trunked system even if a control channel is not present for the selected trunked system. User will select this, then the bank, then will be taken to SCAN LIST 1, MEMORY POSITION 1 where talkgroup ID numbers and alpha tags can be set or changed via the 12-keys and VFO. If talkgroup IDs are already programmed for the selected bank, when the user makes this selection he will be taken to the first available memory location (no IDs programmed). If all IDs are programmed the scanner will move to Scan List 1, Memory position 1. After programming the talkgroup number, the user will be able to make selected settings (alpha tags, delay, beep alert, record) through the Menu below.

8.8.1   Alpha Tag

The ALPHA TAG feature will allow the user to assign each talkgroup an alpha description.   The same characters as outlined in Section 6.1.9 will be used in alpha tagging each talkgroup.   From Trunk Manual mode the user will press the MENU key, select the this portion of the menu, select the ALPHA TAG and the cursor will appear as described in Section 6.1.9 (except it will appear on the top text line).   Selection of the alpha characters will all follow the same steps as outlined in Section 6.1.9.   The ALPHA icon will appear in the display any time a channel is alpha tagged. Note that the user can also program Alpha Tags in Manual Mode by pressing the VFO key and selecting ALPHA and then using the UP/DOWN arrow keys or the VFO tuner to make the characther selections.

8.8.2   Delay

The default delay of 2 seconds will be set each time an ID is programmed into Scan List memory. However, this menu selection will allow the user to change the default. See section 7.1.12 for delay setting options and explanations.

8.8.3   Beep Alert

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This function will be assigned by the user to any selected talkgroup ID memory. When a transmission for this ID is received the scanner will beep twice rapidly at the start of the transmission. The user options will be ON or OFF. The default setting is OFF.

8.8.4 Record

This function will be assigned by the user to any selected talkgroup ID memory and will send any received audio for the talkgroup memory to the Line out jack. The user options will be ON or OFF. The default setting is OFF. Please refer to section 7.1.9 for further information.

Note: Frequencies that are programmed as trunked will not be able to be assigned CTCSS or DCS tones, Delay, Beep Alert, Record, Mode (default to FM), Step (use default for bank). These can only be set if the user changes the Trunk type setting to off. The only setting that can be made for the frequencies (in OFF mode) that will be maintained when a Trunking Type is restored, is Attenuate.

8.9 Trunking Notes

8.9.1 Programming Multiple Trunked Systems in the Same Bank

The user should be able to load as many LTR systems into a bank as he likes. The talkgroup list for the bank may not apply to multiple systems, but that is up to the user's discretion (the user may assign LISTS 1-3 to the first LTR system in the bank and 4-8 to the second LTR system, etc.). The user may program any combination of trunked systems (Motorola, EDACS, LTR) into the same bank, however the scanner will only look for the type of trunking control (or sub-audible data) channel that has been selected. If more than one Motorola system has been programmed into a bank, the first control channel that is found in the bank will serve as the selected system for the bank (this way a user driving between two distant cities can program in two systems and as one control channel becomes weak and unreadable, the scanner will find the second, stronger, control channel and begin tracking with the appropriate frequencies). The user will have to program talkgroups in separate Scan Lists and turn them on and off as necessary.

8.9.2 EDACS Blockout

The user will be able to "block-out" groups of EDACS talkgroups in the following manner: Enter either an Agency (example 08.) or an Agency and a Fleet (08.04.) into Scan List memory and press the lockout key. The entire Agency or Agency and fleet and all its subfleets will be locked out in both SEARCH and SCAN modes.

8.9.3 Motorola Control Channel Only in SEARCH mode

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If the user is searching an 800 and/or 900 MHz range of frequencies and has turned on Motorola Control Channel only mode (see 8.1.7) for the bank that corresponds to the search range, then as soon as the search finds a Motorola control channel (3600 baud), the scanner will begin trunking and continue to do so until either: 2 seconds have elapsed with no transmissions within the trunk, or the user presses the SEARCH key again.

8.9.4 Display Operation in Trunk Mode

In trunked mode, where CTCSS/DCS tones are not used, the display will operate as follows:

Where Line 1-1 = Normally the Frequency display
Where Line 1-2 = Normally the CTCSS/DCS Tone code display
Where Line 2 = Channel/Talkgroup Alpha Tag
Where Line 3 = Bank AlphaTag

TRUNK SEARCH MODE, NO ACTIVITY (Trunk and Search icons lit):
Line 1-1: Frequency of the Control Channel
Line 1-2: 5 dashed lines
Line 2:   (blank)
Line 3:   FT WORTH PUBLIC SAFETY (bank tag)

MANUAL MODE, DESIRED TALKGROUP NOT ACTIVE
Line 1-1: Displays the ID user is holding for, for example 32032
Line 1-2: Displays all ID's active on system (search monitor mode)*
Line 2:   East Lake Police (corresponds to 32032)
Line 3:   Tarrant County (bank tag)

MANUAL MODE, DESIRED TALKGROUP ACTIVE
Line 1-1: Frequency on which the desired talkgroup is transmitting
Line 1-2: Displays the Talkgroup ID user holding for and now active
Line 2:   East Lake Police (talkgroup tag)
Line 3:   Tarrant County (bank tag)

SEARCH MONITOR MODE*
Line 1-1: Frequency of the Control Channel
Line 1-2: Flashes all active ID's on the system
Line 2:   Flashes any alpha-tags for the ID's displayed on Line 1-2
Line 3:   Tarrant County (bank tag)

SCAN MODE (Talkgroups in Scan List not active)
Line 1-1: Frequency of the Control Channel
Line 1-2: Flashes all active ID's on the system
Line 2:   (blank)
Line 3:   Tarrant County (bank tag)

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SCAN MODE (A talkgroup in the Scan List is active)
Line 1-1: Frequency of the Control Channel
Line 1-2: A talkgroup ID of the Scan List that is now active
Line 2:   East Lake Police (talkgroup tag)
Line 3:   Tarrant County (bank tag)

* See press and hold of SEARCH key (Search Monitor mode) while
trunking in BC-235, BC-245 or BC-895.

9. Search Event Portion

The Search Event Portion of the menu will be used for users who wish to set up
search ranges and make settings for their ranges.   The user can store up to 10
search ranges in memory. A minimum of 200 frequencies can be locked out in
Search.

9.1 Entering search limits and alpha-tagging search ranges

Upon pressing the menu key the user can select SEARCH EVENT from the
menu options.   The user will see the following screen upon selecting this
option:

```
┌─────────────────────────────────────────────────┐
│  1 Search Range 1                                │
│                                                  │
│                                                  │
└─────────────────────────────────────────────────┘
```

Line one is highlighted in the above illustration. The SEARCH icon will be lit and
the current channel number will be flashing in the top left of the display. The user
can select line one to enter the limits of their search range by pressing select.
Once the user presses select, line 2 will display "ENTER LIMITS". The user will
then use the 12-keys to enter the limits in the frequency portion of the display.
EXAMPLE: Press 44.000, press LIMIT key, press 49.000, press the LIMIT key.
Once the two limits have been set, the frequency display will flip-flop between
the high and low limits. Also, the second line of the alpha display will now
change to read "ENTER ALPHA TAG". The VFO setting will change to alpha,
SEARCH RANGE 1 will be replaced with a flashing cursor on the first line at the
first alpha character. The user can use the VFO to enter an alpha tag for this
range or the user can press the SEARCH key to begin the search of the range.

(If the user presses SELECT again, the menu will return to the above example
and the user can choose another search range to program or edit an range
already programmed.)

*Note: At any time during a search the user may press MENU to pull up the
following search event options: DELAY, ATTENUATE, STEPS, MODE, TONE*

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DATA, RECORD, AUTO STORE, CHAIN SEARCH.   The user will not have to select a range to edit if a search is in progress.

9.2 Delay

The Delay option for a selected search event or one that is in progress will have the following user options:

0 SECONDS: No Delay
1 SECOND: The scanner will wait on a frequency for 1 second after a transmission has stopped.
2 SECONDS: The scanner will wait on a frequency for 2 seconds after a transmission has stopped.
4 SECONDS: The scanner will wait on a frequency for 4 seconds after a transmission has stopped.
INFINITE: The scanner will wait on a frequency until the user presses any key to make the scanner start scanning again.
-2 SECONDS: The scanner will wait on a frequency for only 2 seconds and then continue scanning. *(see note below)*
-5 SECONDS: The scanner will wait on a frequency for only 5 seconds and then continue scanning. *(see note below)*
-10 SECONDS: The scanner will wait on a frequency for only 10 seconds and then continue scanning. *(see note below)*

The default for this feature is a 2 SECOND delay.   The DELAY icon will appear anytime a search is active that has a delay assigned other than if the user selects NONE.   The negative number delays act as a pause on a channel for the specified time.

NOTE: The negative delays will stay on a frequency for the specified times and then continue to search when the delay times out.   EX: If a search range has been set with a 10 second pause and the frequency becomes active for a transmission of 6 seconds, there should be a 2 second default before the scanner resumes searching (if there is has been no further transmissions within the two seconds).   If there is a transmission during the two second delay period, then the timer should reset and pause should be in effect for another ten seconds.

9.3 Attenuate

The ATTENUATE feature will allow the user to attenuate the sensitivity for the selected search range.   The user will have the options of ON or OFF.   The default setting is OFF.   The level of attenuation should, should be the same as what is used on other current scanners.   When activated the ATT icon will be displayed in the LCD screen.

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9.4 Steps

The STEP feature will allow the user to be able to change the default step size for the selected or active search range. The following chart will show the default step sizes for each of the frequency ranges:

25.000-25.9950	5.0KHz
26.000-28.9950	5.0KHz
29.000-53.9950	10.0KHz
54.000-71.9950	5.0KHz
72.000-75.995	5.0KHz
76.000-87.9950	50KHz
88.0000-107.9950	100KHz
108.0000-136.9950	25KHz
137.0000-162.0000	5.0KHz
162.0125-173.9875	12.5KHz
225.000-399.9950	50KHz
400.000-511.9950	12.5KHz
512.000-549.9950	50KHz
746.0000-805.9950	12.5KHz
806.000-823.9875	12.5KHz
849.0125-868.9875	12.5KHz
894.0125-1300.000	12.5KHz

The user will go through the Menu and select the STEP option. The next screen will display the following step sizes (on the 2 text lines) that the user can select to assign to a search range:

1   5 KHz
2   7.5 KHz
3   10 KHz
4   12.5 KHz
5   20 KHz
6   25 KHz
7   50 KHz
8   100 KHz

The user will scroll through the options using the UP/DOWN arrow keys, VFO knob, or by directly accessing the corresponding numerical choice on the keypad.

NOTE: There will be no display in the LCD screen showing the steps that are assigned to a channel. The user will need to go back into the menu to see which step is assigned to the channel.

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9.5 Mode

This feature will allow the user to change the mode that is assigned to a search range. The three options that the user can select will be AM, FM, and WFM. The default modes for each frequency band are as follows:

25.000-25.9950	AM
26.000-28.9950	AM
29.000-53.9950	FM
54.000-71.9950	WFM
72.000-75.9950	FM
76.000-107.9950	WFM
108.000-136.9950	AM
137.000-173.9950	FM
174.000-215.9950	WFM
216.000-224.9950	FM
225.000-399.9950	AM
400.000-511.9950	FM
806.000-823.9875	FM
849.0125-868.9875	FM
894.0125-1300.000	FM

The LCD icon for the appropriate selection will appear in the LCD for the default mode and will only change if the user go into the menu and makes a change to the default settings. The user will use the SELECT key or the VFO to choose the highlighted selection from the menu text lines.

9.6 Tone Data

The TONE DATA section of the SEARCH EVENT menu will allow the user to select a specific tone to be assigned for a search range, or search for any tone that may be in use in the selected range, or lockout a specific tone from the range yet still search for all other tones. The user will access the Menu and select TONE DATA. Upon selecting the user will have 2 options.

The first will be TONE SEARCH. TONE SEARCH will allow the user to search a range and search for all tone codes in that search range. The default setting for this feature is ON. If a transmission is detected with an assigned tone the tone number will appear in the display next to the frequency.

The second will be TONE PROGRAM. This option from the menu will allow the user to choose a specific CTCSS/DCS tone code to assign to a search range. The search will only stop on a broadcast using the selected tone. When a user selects this option from the menu he will be presented with two options on the text lines:

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1. CTCSS
2. DCS

The user will highlight using the UP/DOWN arrow keys and then select with either the press of SELECT or pressing VFO knob. When either option is selected the lowest two tone codes for either CTCSS or DCS are displayed in the two text lines. The user can use the VFO or UP/DOWN arrow keys to highlight the desired tone, then press SELECT or push the VFO to apply the tone code. Once this is done the CTCSS/DCS tone number will be displayed in the area next to the frequency display. For a complete listing of CTCSS/DCS codes please refer to sections 7.1.3 and 7.1.4

NOTE: The user may press the LOCKOUT key before pressing the select key and this will lockout the tone code from being searched for. The scanner will search for all tone codes except for the locked out tone.

9.7   Record

This function will allow the user to designate any active frequency within the search range to be recorded by an external device. The user will be able to select between ON or OFF. The default setting is OFF. The LINE icon will appear in the LCD when a channel has been assigned the record feature.

9.8 Auto Store

The AUTO STORE feature will allow the user to automatically store an active frequency from a search in to the first available channel. This feature will have the options of ON or OFF. When this feature is activated during a search, the AUTO icon will be displayed in the LCD screen.

9.9 Chain Search

This feature will allow the user to chain Search Ranges 6 through 10 together. The user options for this feature is OFF or ON. The default setting is off. The user cannot individually select search ranges to chain. If the user selects on, any search range that is programmed by the user in two or more of the 5 ranges between Search Range 6 and 10 will be chained together. In the On mode, the user will go into the Menu, select Search, and choose any one of Search Range 6 through 10 and then press the SEARCH key. The scanner will then, for example, search Search Range 6 (one pass through the range), then Search Range 7, then Search Range 9, then Search Range 6 again, etc. (In this example the user has not programmed any range for Search Ranges 8 and 10.)

10. Service Search

The user can scan 10 pre-programmed sets of service search frequencies. To access these sets, the user will press and hold the SEARCH key for 1.5 seconds

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(a double beep will sound). (Note that Service Search cannot be accessed if a trunked system is being searched or scanned at the time the SEARCH key is pressed and held.)

10.1   Service Search Selections

Once the Search key is pressed and held the SEARCH icon will flash, the current channel will flash and the alpha portion of the display will show the first two of the ten options:

1 Public Safety

The user will use the up/down arrow keys or the VFO to scroll to his choice. He will use the SELECT key to then activate the selection and begin searching. The   ten Service Searches are:

1. Public Safety
2. Marine*
3. Air
4. Rail*
5. News
6. TV Audio*
7. Family Radio*
8. CB Radio*
9. Ham Radio
10. Special

(* Starred services have channel numbers for each frequency.)

10.2   Display during Service Search

During a Service Search, the bottom line of the alpha display will show the service being searched and the top line of the alpha will show the corresponding channel number when there are any active channels (on services which have channel numbers). Both lines should be centered. For example:

Channel 16
Marine

The channel 16 frequency, 156.8000 will appear in the frequency portion of the display and the SEARCH icon will continue to flash during the transmission.

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10.3   Service Search Default Settings

The following settings will be set by default and cannot be adjusted by the user during a Service Search:

Delay: Two Seconds
Mode: Default mode
Step: Default step
Attenuate: Off
Record: On
Data Skip: On
CTCSS/DCS Tone Search: On